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A Profit-Based Unit Commitment using Different Hybrid Particle Swarm Optimization for Competitive Market

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Abstract

Two proposed approaches are presented for optimal scheduling of unit commitment (UC) in competitive market. The particle swarm optimization (PSO) technique is used to find out the solution of both optimal UC scheduling and power generation dispatching problems, simultaneously. These approaches depend on two sigmoid functions to obtain the binary values for the PSO technique. The first approach considers the fuzzification of power generation costs as a sigmoid function, while the second approach considers the fuzzification of power generation as a sigmoid function. An exponential function is proposed to minimize power generation costs as well as maximize their own profit, while all load demand and the power generation constraints are satisfied. Therefore, the generations companies (GENCO) can schedule their output power according to a maximum own profit. This means that, the GENCO must take a decision, how much power and reserve generations should be sold in the markets to obtain a maximum own profit. Different applications are carried out using various standard test systems to show the capability of the proposed approaches the competitive market.

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